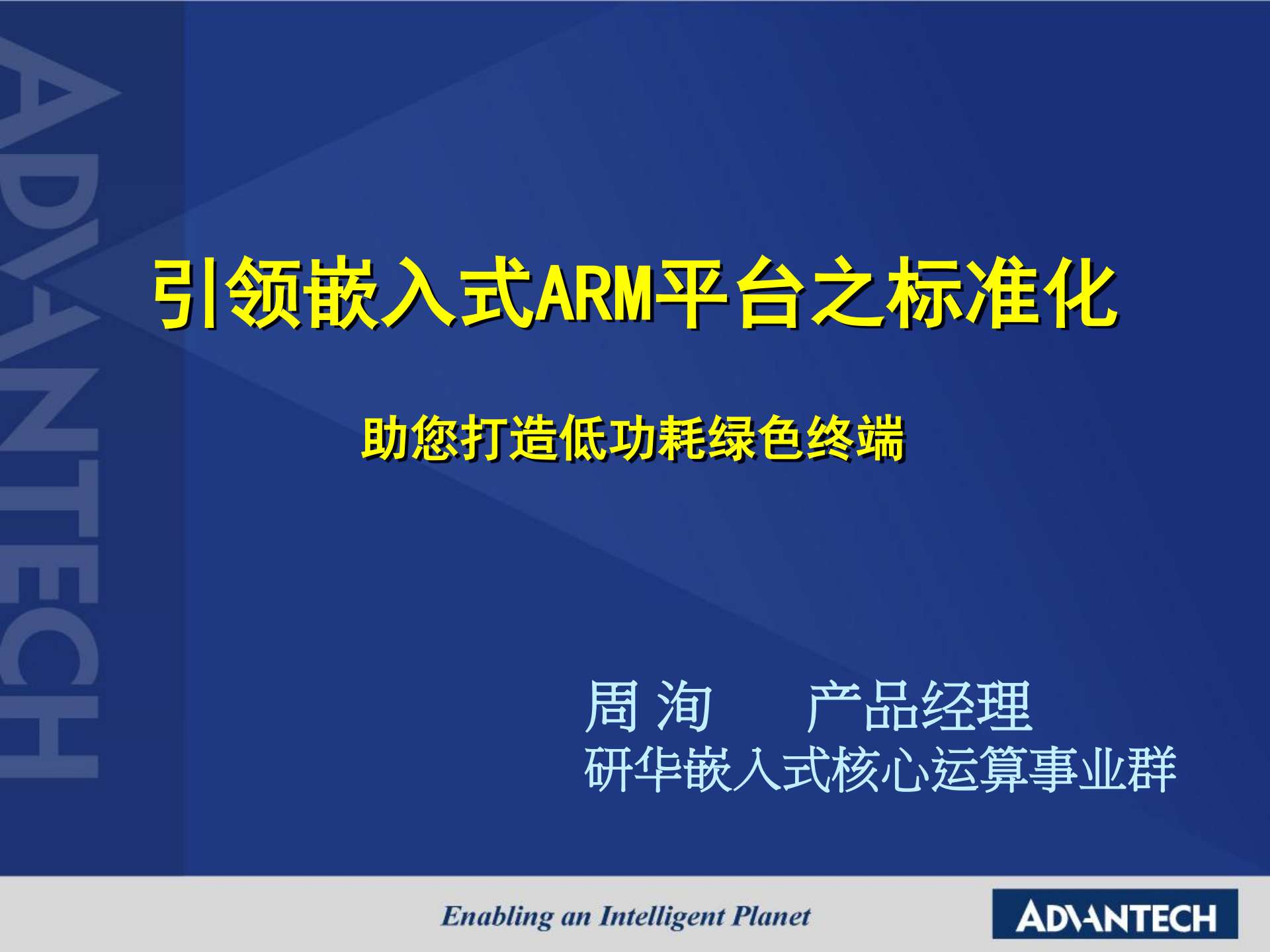




# 引领嵌入式ARM平台之标准化

助您打造低功耗绿色终端

周 洵      产品经理  
研华嵌入式核心运算事业群

# IOT与智慧城市发展中RISC巨大商机

Internet  
of  
Things

+

Cloud  
Computing



电梯多媒体



PIDS系统



3G信号检测



铁路巡检



电力控制



机房监控



公交车广告



清分机/点钞机



车/船/航显示



高精度GPS



船载导航

清分机/点钞机

军用卡车

机器人DCS



重型机械



自动售卖机

重型机械

机器人DCS



# Avantech看到的ARM嵌入式市场趋势

X86 solution 转型 ARM® solution

低端ARM升级到高性能ARM

# 市场趋势----X86 to ARM

## 典型案例1(KIOSK)自动贩卖机/清分机

- 现在方案：X86整机+XP
- 潜力: 6K/Y
- 转型方向：ARM Cortex®-A9+ **Android**



## 典型案例2(环保)：气相分析仪

- 以前方案：X86主板
- 潜力: 3K/Y
- 转型方向：ARM Cortex-A9单板+ **Android 4.0** +OpenFrame



# 市场趋势----X86 to ARM

## 典型案例3（医疗）：超声

- 以前方案：X86+XP
- 转型方案: **Cortex-A9 ( system bus ) +Android**
- 潜力: 3K/Y



## 典型案例4（Digital Signage）：电梯广告机

- 以前方案：X86 For 高端，ARM9 For 低端
- 客户高端转型方向：**Cortex-A9（低成本、双通道24bit LVDS）+ Linux+QT**
- 潜力: 5K/Y



# 市场趋势----低端ARM升级到高端ARM

- 典型案例1：机器人控制手柄，年用量7K



- 以前方案：ARM9+WINCE6.0/5.0
- 客户升级：**Cortex-A9 ODM+WINCE**  
(产品升级换代、统一平台、加显示)
- 潜力：30K/Y

- 典型案例2（特殊PAD）：机载娱乐设备



- 以前方案：Cortex-A8+Android
- 客户升级：**Cortex-A9 ( system bus ) +Android ( 2D/3D )**
- 潜力：3K/Y

# 研华协同创新研发中心RISC发展策略



Kunshan Manufacturing Center

R&D Building

10 mins by walk

Learning Center

Campus Hotel

Land : 27,000 m<sup>2</sup>

Floor Space : 40,000 m<sup>2</sup>

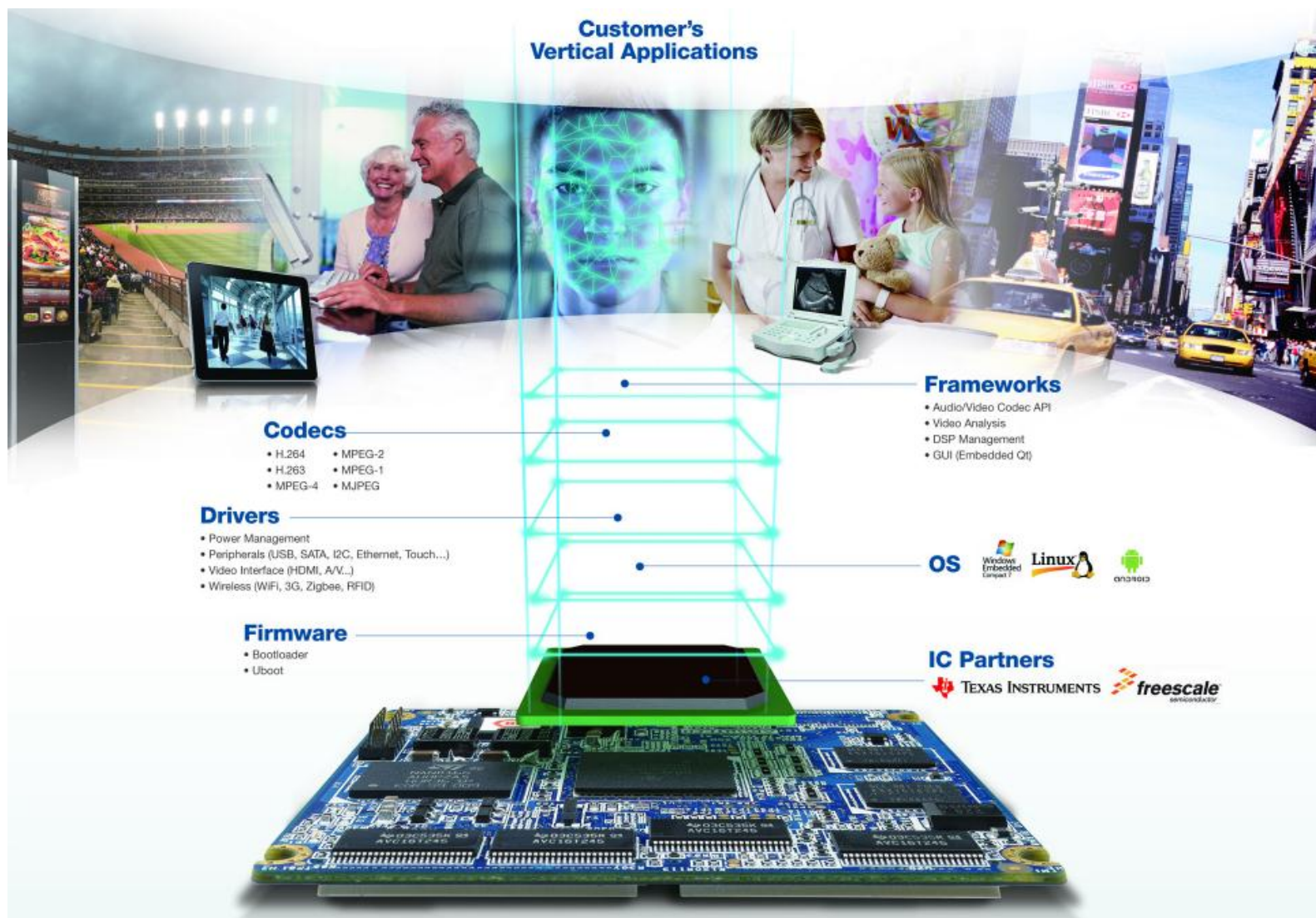
Construction : Oct. 2011

建立以A+TC为核心的RISC & Linux  
设计中心，满足大中华市场需求。

*Enabling an Intelligent Planet*

**ADVANTECH**

# 研华提供高端工业级RISC/ARM平台



Enabling an Intelligent Planet

ADVANTECH

# 研华提供的RISC/ARM平台服务

| USER APPLICATIONS |                                                                                                      |                                                        |                                                                                                                 |                                                                                              |                 |
|-------------------|------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------|
| FRAMEWORKS        | Audio/Video<br>Codec API                                                                             | Video Analysis                                         | DSP Management                                                                                                  | GUI<br>(Embedded Qt)                                                                         |                 |
| CODES             | H.264                                                                                                | H.263                                                  | MPEG-4                                                                                                          | MPEG-2                                                                                       | MPEG-1<br>MJPEG |
| DRIVERS           | Power Management                                                                                     | Peripherals<br>(USB, SATA, I2C,<br>Ethernet, Touch...) | Video Interface (HDMI,<br>A/V...)                                                                               | Wireless<br>(WiFi, 3G, Zigbee,<br>RFID)                                                      |                 |
| OS                |  Windows Embedded   |                                                        |  ANDROID                       |  Linux    |                 |
| FIRMWARE          | Bootloader                                                                                           |                                                        |                                                                                                                 | Uboot                                                                                        |                 |
| IC PARTNERS       |  TEXAS INSTRUMENTS |                                                        |  freescale™<br>semiconductor |  NVIDIA® |                 |

## ARM-Based System Integration



Computer-on-Module



Single Board Computer



Digital Signage



Box PC

*Enabling an Intelligent Planet*

**ADVANTECH**

# 硬件/软件 设计集成



## RISC Module



RTX



SMARC



Qseven



## 3.5" SBC



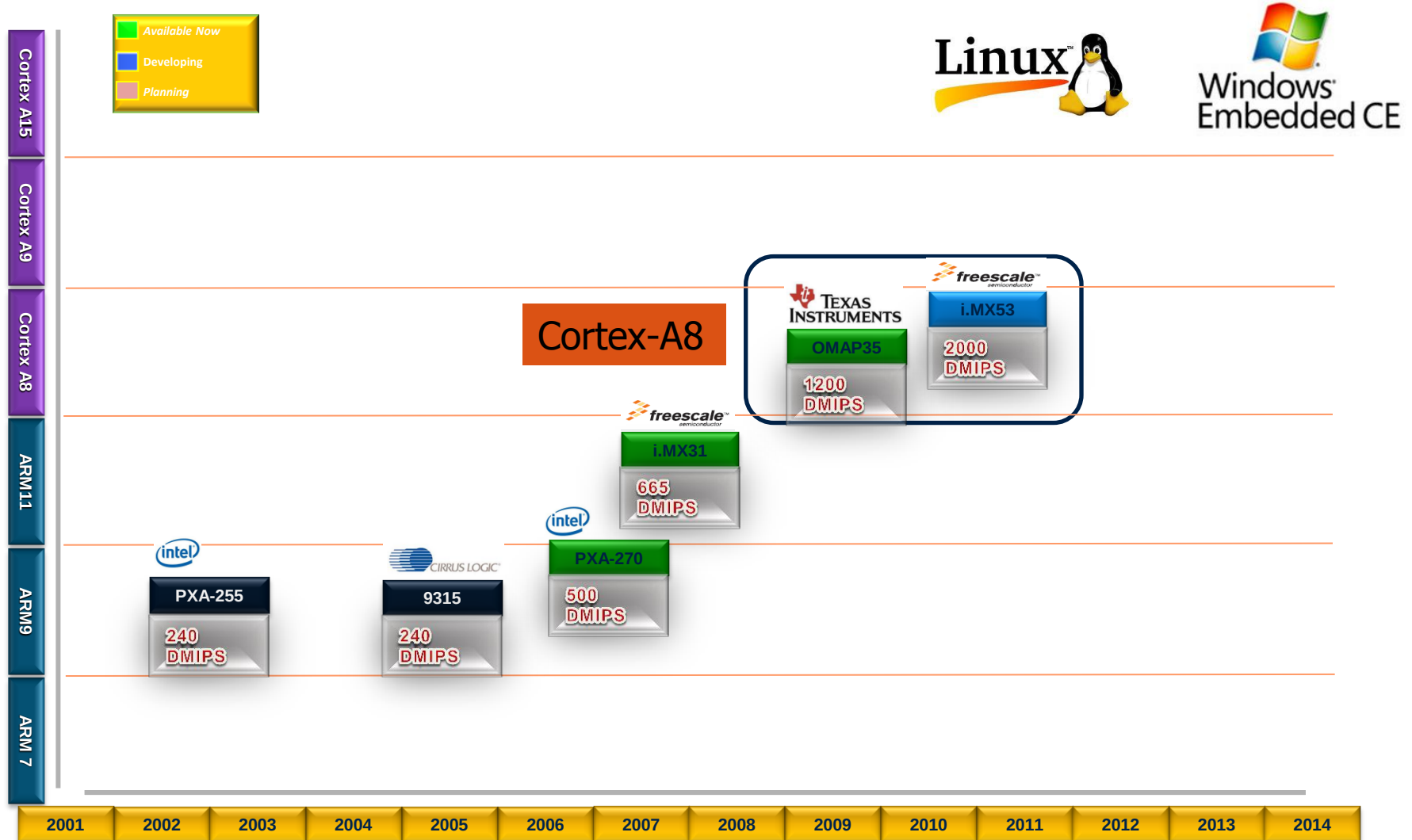
## Box



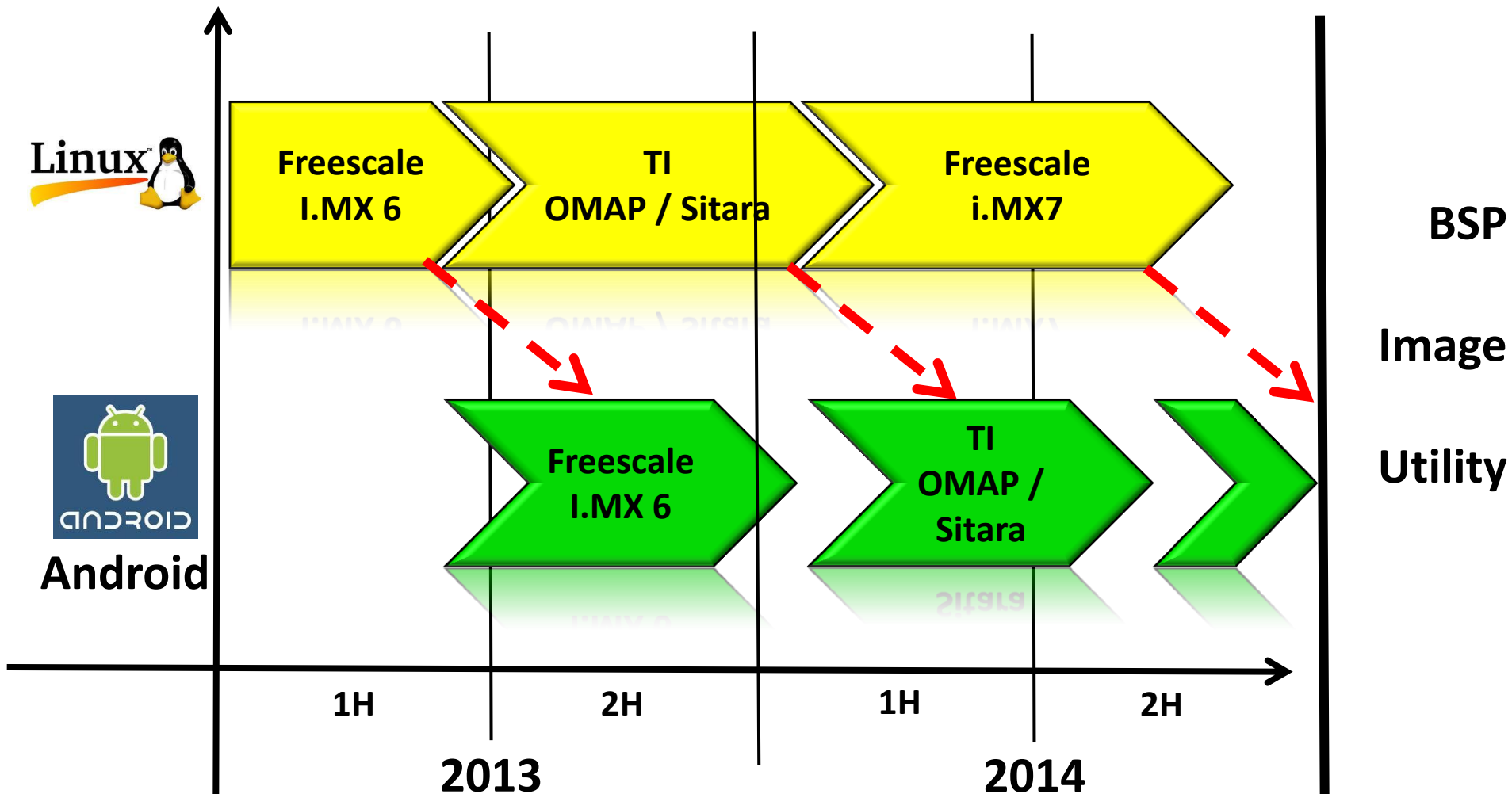
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ADVANTECH

# Advantech RISC/ARM Past 10 Years Roadmap



# Software Development Strategy & Schedule



# ARM在嵌入式应用面临的问题

专案性质, 资源重复利用率低

信息不明确, 开发风险高

软件硬件相依性高, 分工困难

用不起, 或是不敢用



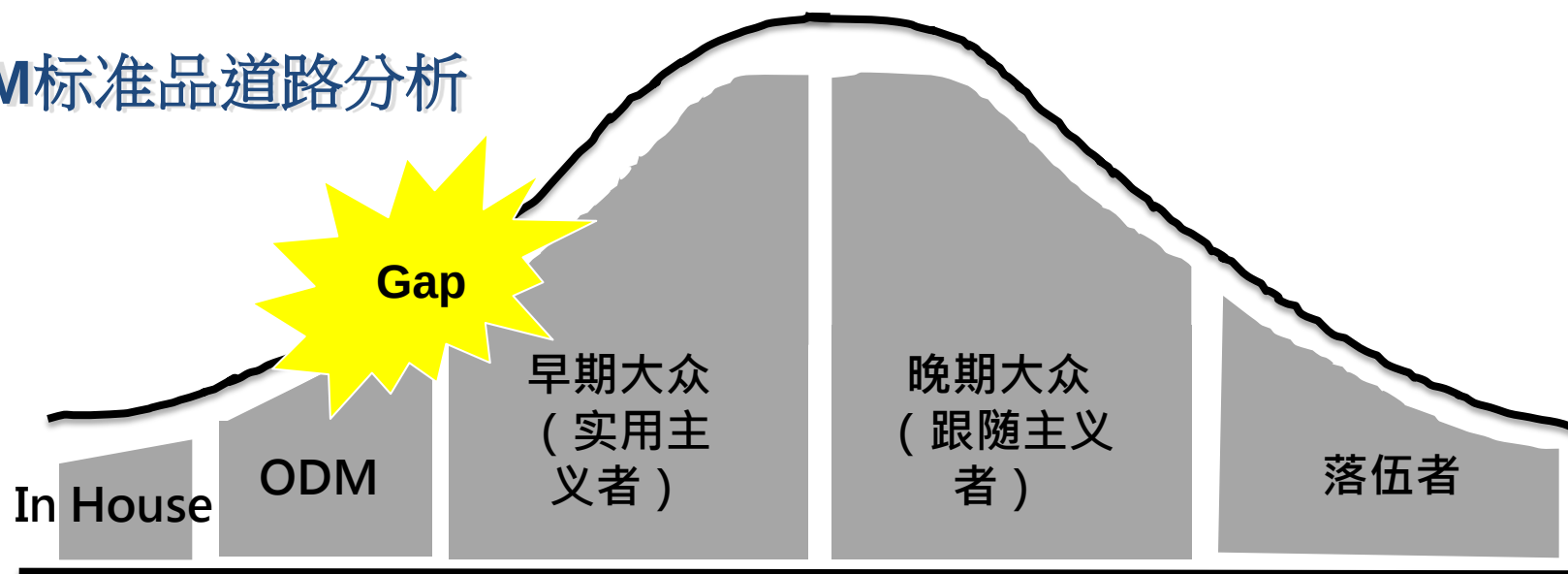
# X86 v.s. ARM for Entry Level Application

|           |             |     |   |            |                                                         |
|-----------|-------------|-----|---|------------|---------------------------------------------------------|
| <b>C1</b> | <b>FAB</b>  | X86 | < | <b>ARM</b> | ARM具备低功耗、体积小、开机快等特色                                     |
|           | <b>Cost</b> | X86 | = | <b>ARM</b> | ARM产品单价低，但整体开发成本较X86高                                   |
| <b>C2</b> |             | X86 | < | <b>ARM</b> | X86 solution多如牛毛，但是ARM目前都还是属于Project base，客户对ARM产品了解度不高 |
| <b>C3</b> |             | X86 | < | <b>ARM</b> | ARM因为标准化不高，所以对客户的道德成本相对较高                               |
| <b>C4</b> |             | X86 | < | <b>ARM</b> | ARM都是Project base，因为客户被绑定风险高                            |

X86相对于ARM在低阶嵌入式应用具备较低的C2，C3与C4成本，但是为何客户还是愿意采用ARM solution，主要是因为ARM提供的“FAB”对低阶嵌入式应用具有很大的吸引力！

| <b>Feature</b> | <b>Advantage</b> | <b>Benefit</b>      |
|----------------|------------------|---------------------|
| 低功耗<3W         | 待机与工作时间长         | 较佳的工作效率与维护成本        |
| -40~105 工作温度   | 可在较苛刻环境下工作       | 产品有差异，可以卖较好的价格      |
| SOC设计          | 系统体积可以大幅缩小       | 增加可已导入的应用，商机变大，成本变低 |
| 开机启动快          | 素缎客户等待的时间        | 相对与X86方案，能较符合客户期待   |

# ARM标准品道路分析



|        |                       |                             |                                                                      |                                  |                                    |
|--------|-----------------------|-----------------------------|----------------------------------------------------------------------|----------------------------------|------------------------------------|
| 特点     | 拥有强大的技术实力，但是产品局限于自身应用 | 单一project数量大，足够支撑外包开发所产品的成本 | 具备所在产业的竞争优势，也了解ARM的优势，也想用ARM来提升产品竞争力，但是因为公司规模开发能力，被迫使用标准X86 solution | 受市场潮流与ARM单价低等因素，可能会迫于客户要求进入ARM方案 | 非因技术或是市场因素而不导入ARM方案，如Intel的partner |
| 最在意的4C | C1(u)                 | C1 (u+c)                    | C3<br>C4<br>C2<br>C1                                                 | C1( c)<br><br>C4                 | Ignore                             |
| 角色     | Project Base Model    |                             | Standard Product Model                                               |                                  |                                    |

# Across the Gap~!

| Strategy           |                 | Fix which Cost |
|--------------------|-----------------|----------------|
| 参与标准Formfactor的制定  | Follow: ULP, Q7 | C3, C4         |
|                    | Create:RTX      |                |
| 加强上游厂商连接，做原厂与客户的桥梁 | Freescall       | C2             |
| Design in Service  | Hardware        | C2, C3         |
|                    | Software        |                |

# 引领嵌入式ARM平台之标准化



**SGeT** STANDARDIZATION  
GROUP FOR  
EMBEDDED  
TECHNOLOGIES

**RTX**  
RISC Technology eXtended



Q

S

E

V

E

N



SMARC

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**ADVANTECH**

# 研华ARM标准化规划

软件标准化

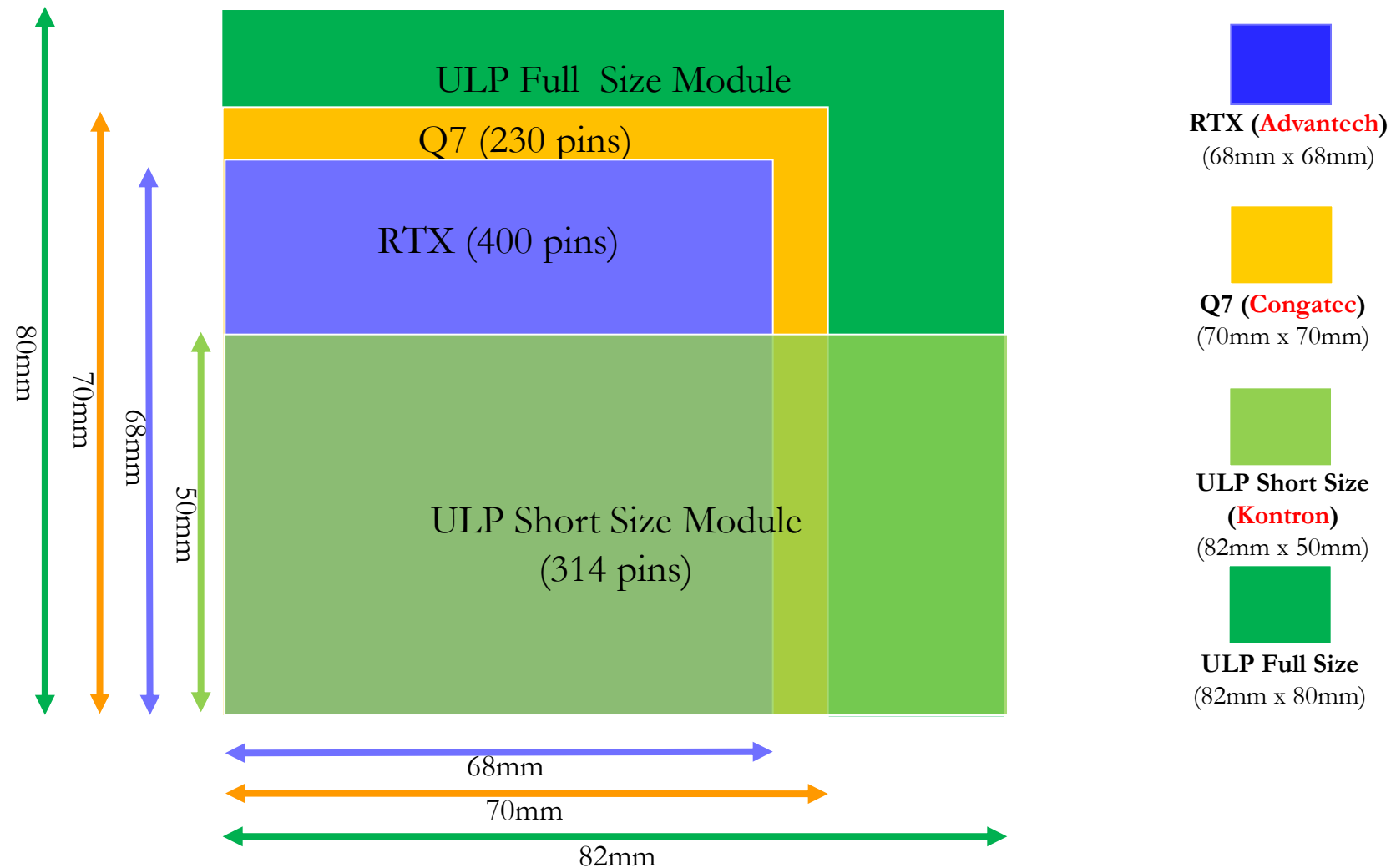
硬件标准化

**ARM技术在  
嵌入式应用中普及**

服务标准化

共生系统  
建立

# 研华Cortex-A9核心模块Form Factor



# RISC Modules in Application

## RTX 68x68mm

### 2.0 mm PCB Thickness

- Solder crack resistance
- Anti-distortion
- Better signal quality

### Wide Range Power Input 5V~24V

- Easy power input design
- High tolerance on voltage change

### Wide Temperature -40~85°C

- More flexible operation environment
- More reliable design

### 4 x B2B Connectors

- Oxidation resistance
- Excellent electrical performance
- Anti-vibration

## Ruggedized Applications



## Q Seven 70x70mm



- First RISC module standard
- Low cost

## SMARC 80x52mm



- Slim type, applicable to RISC
- Camera, Battery & UART support

## Portable Applications



# Roadmap of ROM



Available

Developing

Planning

0 ~ 60°C

-20 ~ 70°C

-40 ~ 85°C

RTX 2.0



ROM-3420



- **Freescall i.MX6**
- 1GB DDR3, 4GB Flash
- 24 bit LVDS, TTL, HDMI
- 1 system bus
- 68 x 68 mm (LxW)

Q2'14

ROM-3310



- **TI Sitara cortex A8**
- 512MB DDR3, 4GB Flash
- 24 bit LVDS,
- 4UART, 1GbE
- 68 x 68 mm (LxW)

Q2'14

SMARC



ROM-5420



- **Freescall i.MX6**
- 1GB DDR3, 4GB Flash
- 24 bit LVDS, TTL, HDMI
- + 3.25~5 VDC
- 82 x 50 mm (LxW)

ROM-5310



- **TI Sitara cortex A8**
- 512MB DDR3, 4GB Flash
- 24 bit LVDS,
- 4UART, 1 GbE
- 82 x 50 mm (LxW)

Q2' 15

ROM-5620



- **Freescall i.MX7**
- 1GB DDR3, 4GB Flash
- 24 bit LVDS, TTL, HDMI
- 1 GbE, 1 USB3.0
- 82 x 50 mm (LxW)

Q3' 15

Q7

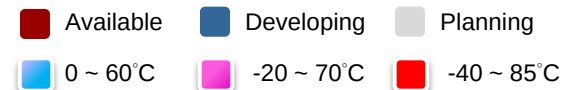


ROM-7420



- **Freescall i.MX6**
- 1GB DDR3, 4GB Flash
- 24 bit LVDS, VGA, HDMI
- UART, GPIO
- 70 x 70 mm (LxW)

# Roadmap of Carrier board



RTX 2.0

## ROM-DB3900



### • RTX V2.0

- LVDS, VGA, HDMI
- 1 system bus,
- 305 x 244 mm (LxW)

Q2'14

SMARC

## ROM-DB5900



- ULP Half/Full size, V1.1/V1.0
- 2 24bit LVDS, VGA, HDMI
- 1GbE, 5 USB, 1 SATA II, SD
- 2 CAN, 4 UART, 3 I2C
- 1 PCI-e w/ SIM
- 305 x 244 mm (LxW)

Q2'14

Q7

## ROM-DB7500



- Q7 V1.20
- 1 GbE, SATA2
- 24 bit LVDS, TTL, HDMI
- + 3.25~5 VDC
- 170 x 170 mm (LxW)

# 基于RTX1.6 的核心模块——适用于Cortex-A8系列产品



采用**高可靠**的板对板连接器  
4X100Pin



**PCB厚度 1.6mm**,保证产品的**可靠性**



**额外Buffers/ 电压转换电路**

- 更好的扩展性
- 确保数据传输时没有杂讯
- 提供**3.3V** 工业级电压

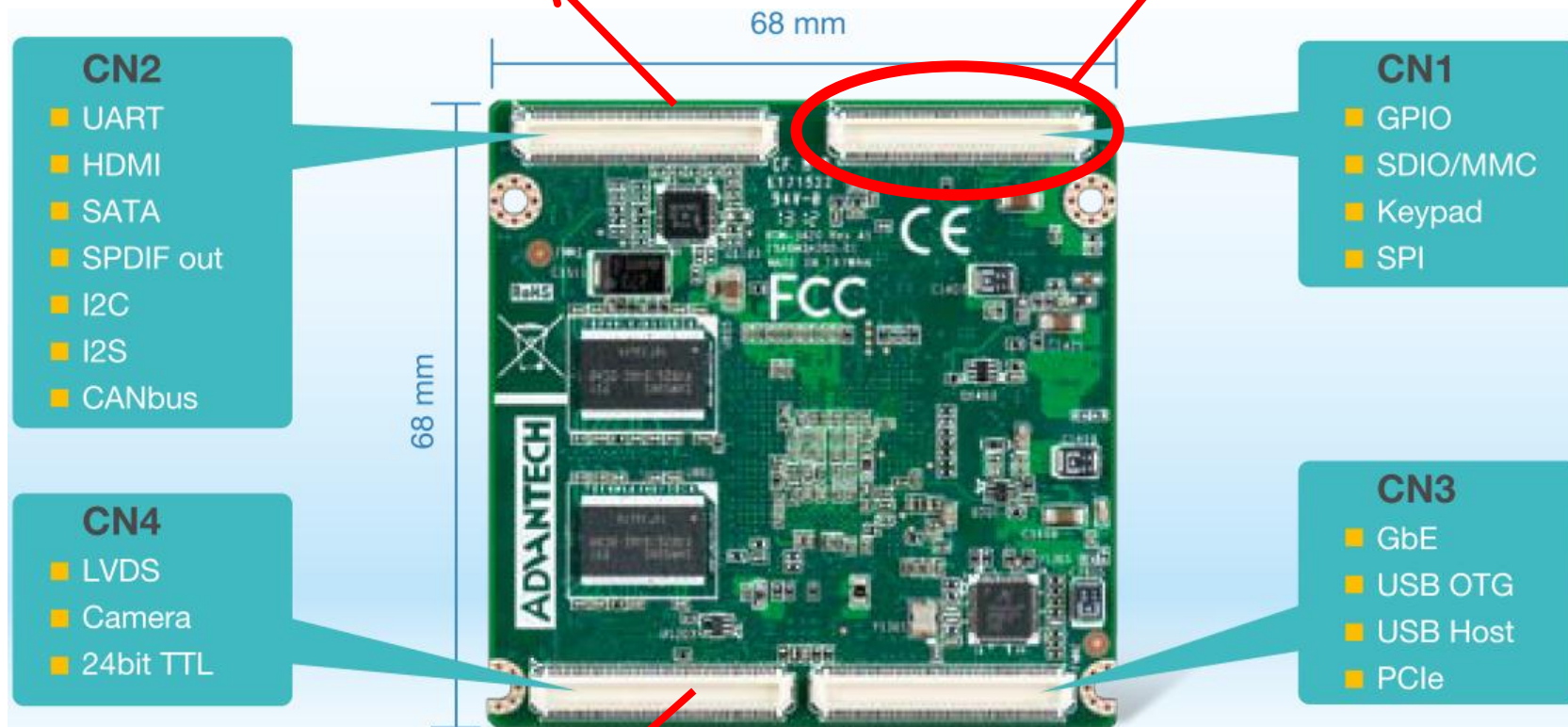
# Key Feature of RTX 2.0

## 2.0mm PCB

Anti-Vibration,  
Anti-Pressure

## B2B Connector

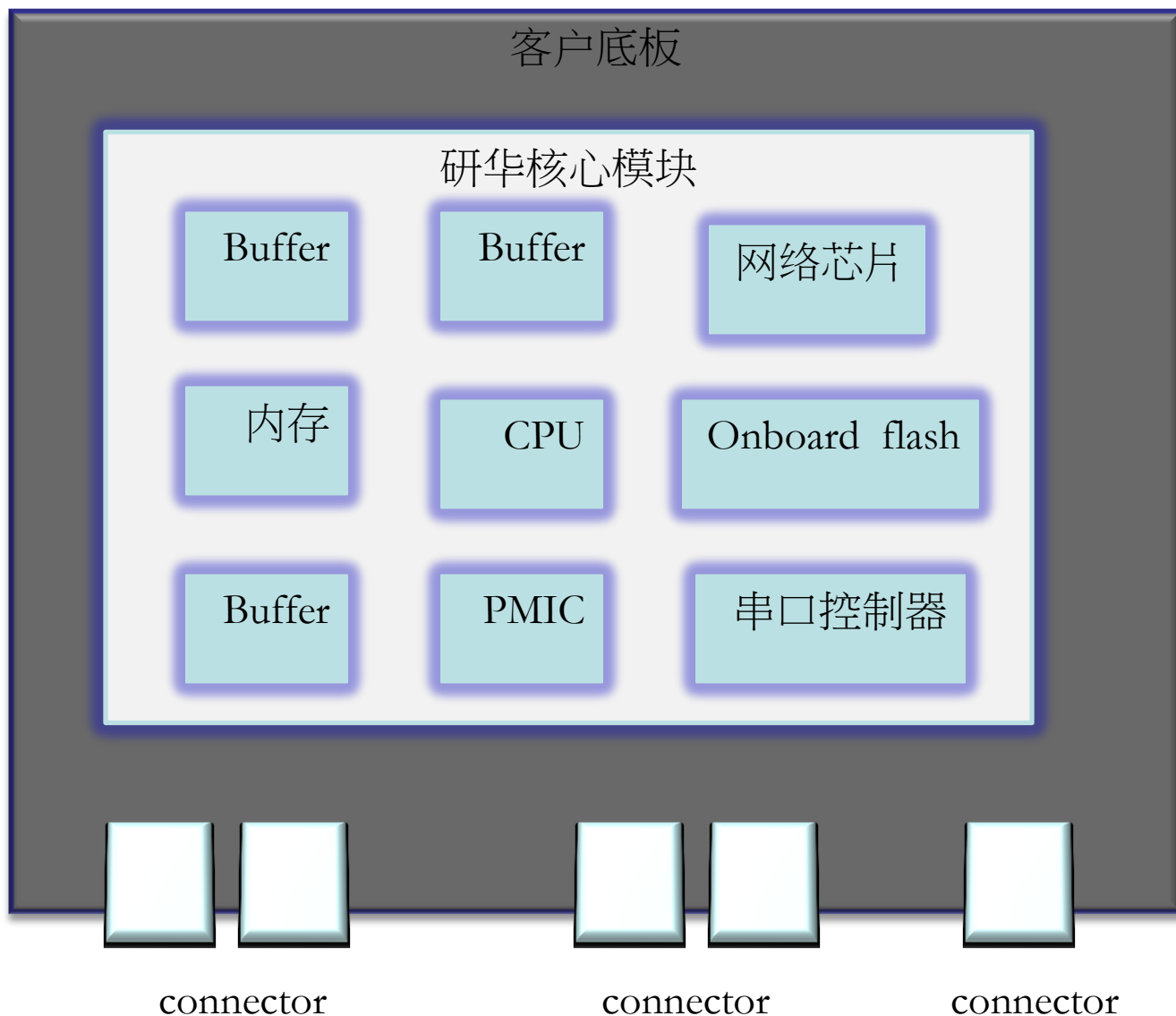
More reliable  
connection



## Wide input Voltage

5~24V wide range input

# 基于研华核心模块开发载板



## 客户载板开发

- 开发难度小
- 开发风险低
- 载板cost低
- 投入人力少
- 开发周期短
- 稳定性好

# Roadmap of RSB (3.5" SBC)

## Signage SBC



### RSB-4410

- Freescale i.MX 6
- 1 HDMI, 1 VGA, 1 LVDS
- 1 USB 2.0, 1 UART, 1 GbE
- 1 SD, 1 Audio out
- 1 Mini PCI-E w/ SIM
- 2 USB 2.0 via pin-header
- 2 2 wires UART
- 1 DC-jack, 12 VDC-in
- 146 x 102mm (3.5")



Available

Developing

Planning

0 ~ 60°C

-20 ~ 80°C

-40 ~ 85°C

Fanless

## Auto. SBC



### RSB-4210

- Freescale i.MX 53 1GHz
- 512 MB DDR3, 2GB Flash
- HDMI, VGA
- 4 USB, 1 OTG, 1 UART
- 2 10/100Mbps LAN
- 1 SD / SIM card
- 1 Mini PCI-E(only USB)
- 146 x 102 mm (3.5")



### RSB-4220

- TI Sitara AM335x cortex-A8
- 512MB DDR3, 4 G Flash
- 1 LVDS, USB, 1 UART
- 4 UART, 8 GPIO (Isolation)
- 2 Gigabit LAN
- 1 Mini PCIe(only USB)
- 1 SD / SIM card
- +12/19/24 VDC-In
- 146 x 102 mm (3.5")



## Freescale CRB

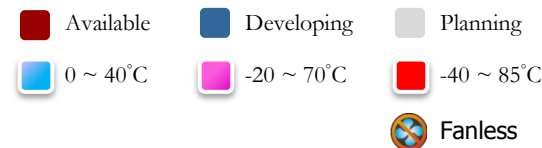


### RSB-4411

- i.MX6 Solo/Dual/Quad
- 512 MB DDR3, 32GB Flash
- 1 USB OTG, 2UARTs
- 4 USB 2.0, 1Micro SD, 1GbE
- 1 Mini PCIe
- 1 Mini PCIe (mSATA)
- +12VDC-In
- 146 x 102 mm (3.5")



# Roadmap of Box



## Networking Box

**Linux** 

**UBC-200** ■ 

- Freescale i.MX6 Dual 1G
- 1GB DDR3, 4GB Flash
- 1 HDMI
- 1 USB 2.0, 1 SD, 1 GbE
- 1 Mini PCI-Express w/ SIM
- +12/19/24 VDC-in
- 108x 79x 30mm

**Q1' 14**



**Linux** 

**UBC-220** ■ 

- Freescale i.MX6 Dual 1G
- 1GB DDR3, 4GB Flash
- 1 HDMI
- 1 USB 2.0, 1 SD, 1 GbE
- **2 Mini PCIe w/ SIM**
- +12/19/24 VDC-In
- 108x 79x 30mm

**Q2' 14**



**Linux** 

**UBC-211** ■ 

- **TI Sitara AM335x cortex-A8**
- 512MB DDR3, 4GB Flash
- 1 USB 2.0, 1 SD, **2GbE**
- **1 Mini PCIe (USB signal)**
- +12/19/24 VDC-In

**Q3' 14**



**Linux** 

**UBC-221** ■ 

- i.MX6 Solo/Dual/Quad
- 512 MB DDR3, **32GB Flash**
- 1 USB OTG, 2UARTs
- 4 USB 2.0, **1Micro SD**, 1GbE
- **1 Mini PCIe**
- **1 Mini PCIe (mSATA)**
- +12VDC-In

**Q2' 14**



## Signage & Automatic

**Linux**  **Android** 

**UBC-DS31** ■ 

- Freescale i.MX 6 Dual core
- 1 GB DDR3, 4 G Flash
- HDMI / CRT
- 1 USB / 1 UART
- 1 GbE/ 1 SD
- 191x129x30mm

**FULL HD 1080**



**Linux** 

**UBC-FA30** ■ 

- **TI Sitara AM335x cortex-A8**
- 512 MB DDR3, 4 G Flash
- 1 USB / 1 UART
- 4 UART / 8 GPIO (**Isolation**)
- 2 Gigabit LAN
- 1 Mini PCIe(USB signal)
- 1 SD / SIM card
- +12/19/24 VDC-In

**Q2'14**



# UBC-DS31 Product Brief

ARM Cortex-A9 Dual  
H/W Full HD engine

Built-in Giga LAN  
Wi-Fi , Bluetooth & 3G



**UBC-DS31**

Hybrid chassis with  
Wall / VESA / Flexible  
mounting kit

Bundle  
Lite signage player  
& SUSI Access for  
Signage

# UBC-DS31 Mechanical Highlight



Simple way to SD & SIM exchange



Special design for cable strong fixed

100 times  
MTBF



Latch locker, screw-less dismantle



Screw-less for assembly

# I/O Description

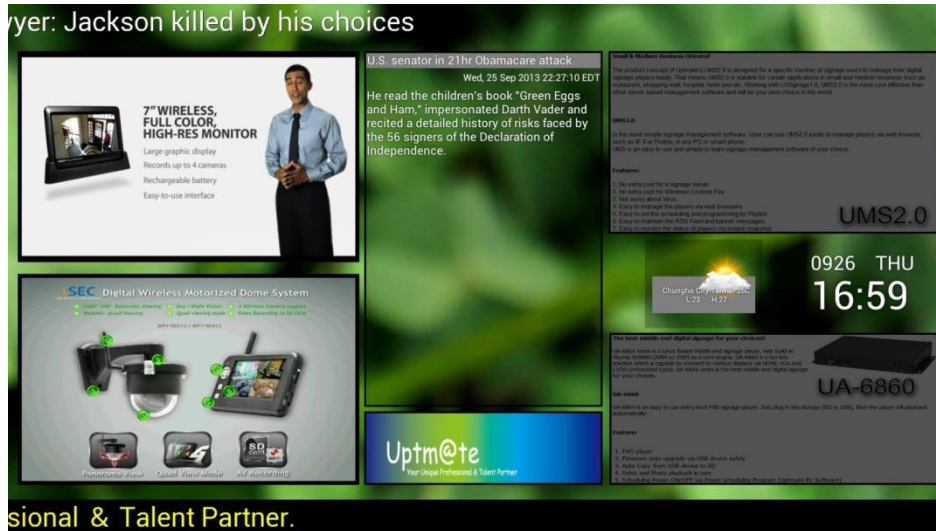


Power on/off      Wireless

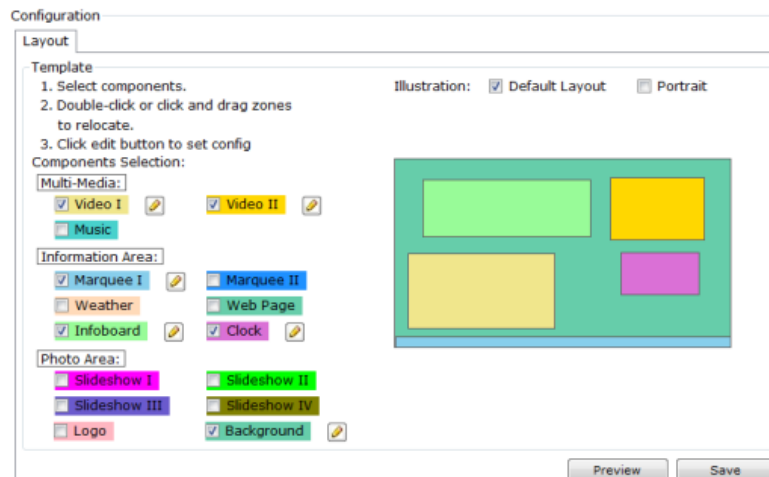


# Android Signage S/W of UBC-DS31

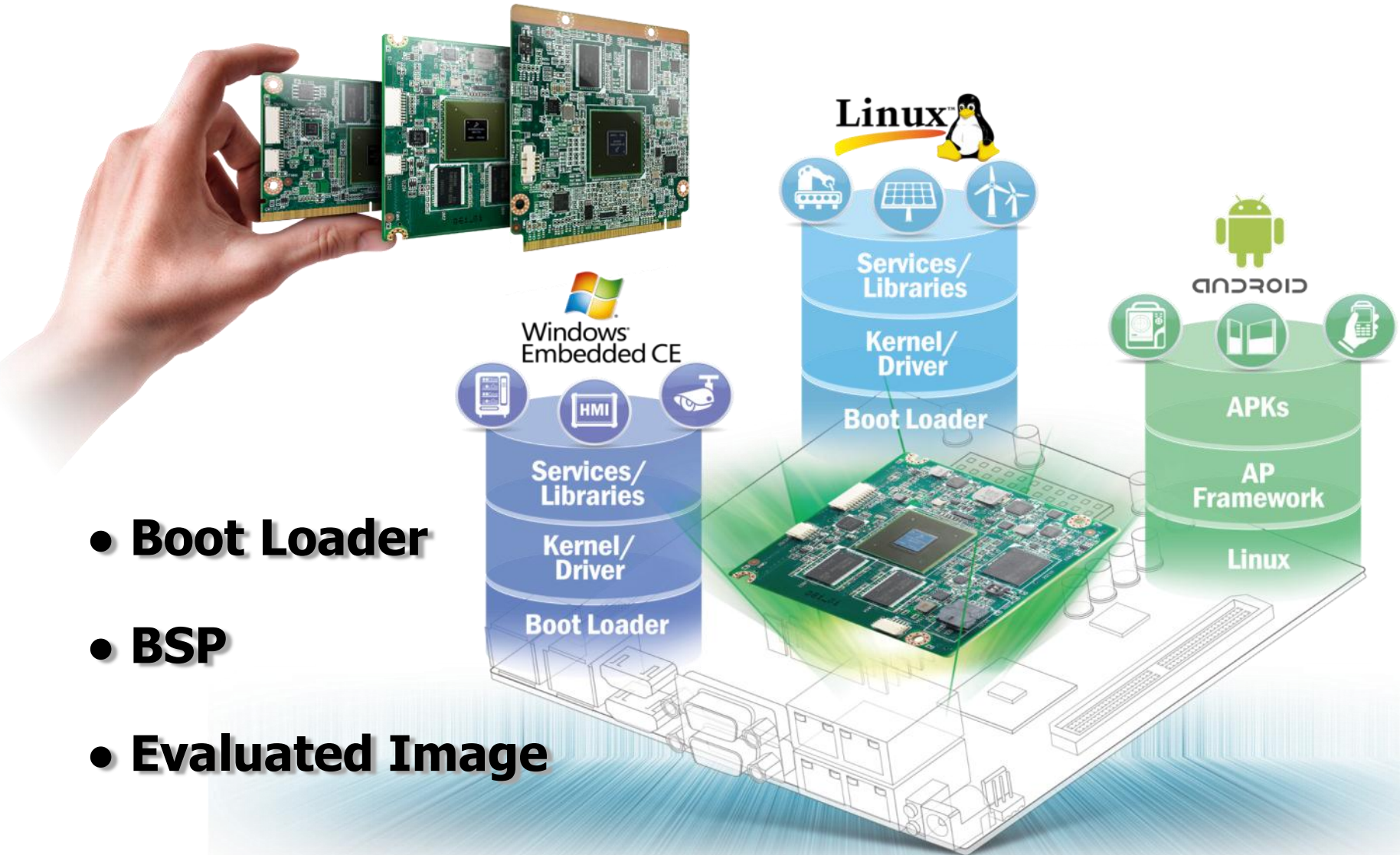
## Android Signage S/W : Uposter



- Android base player(4.2.2)
- Max. 11 Widgets
- 2 Full HD video playback capacity
- Landscape & Portrait display
- System Recovery via SD Card
- Scheduling Power ON/OFF
- Content via FTP/Dropbox
- HTML5/ Flash/ Java via Web
- Multi-language support
- Layout editor of MS Windows



# 多样化的嵌入式操作系统支持



# 标准化Middleware服务



减少开发难度

缩短开发时间



降低升级成本

跨越硬件平台



*Enabling an Intelligent Planet*

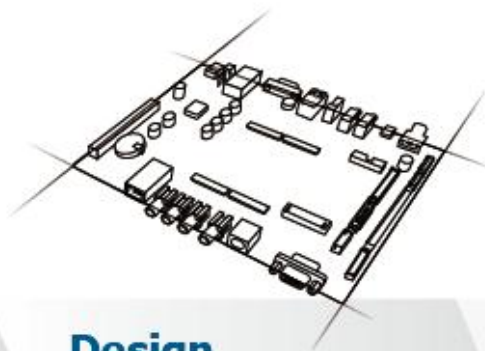
**ADVANTECH**

# 标准化Design In 服务



## Planning

- Consultant services suggest appropriate solutions considering technical trends, specs and schedule
- Offer suitable evaluation kit(s) for customer evaluation



## Design

- Technical documents for optimizing layout/schematics
- Referenced schematics to speed up development of carrier board
- BSP ready for AP development
- Customer's carrier board schematic review



## Integration

- Board level integration support
- Peripheral module integration
- Consult for HW/SW fine-tuning
- SW customization services
- Optional thermal solution for system integration



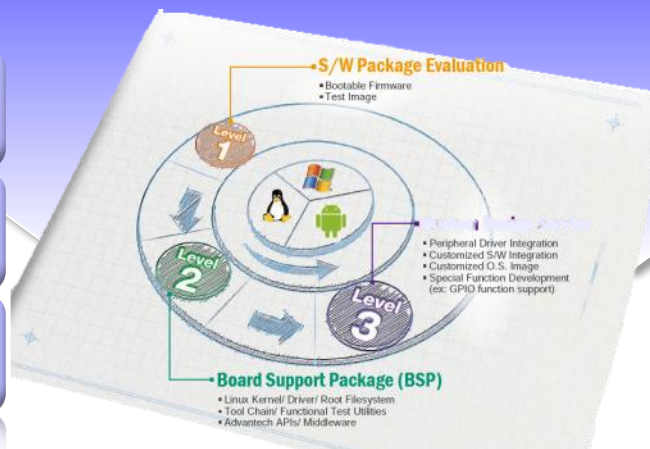
## Validation

- Test tools ready to validate customer's solution
- Consultant services for HW/SW related issues
- Test sample validation- Production run confirmation

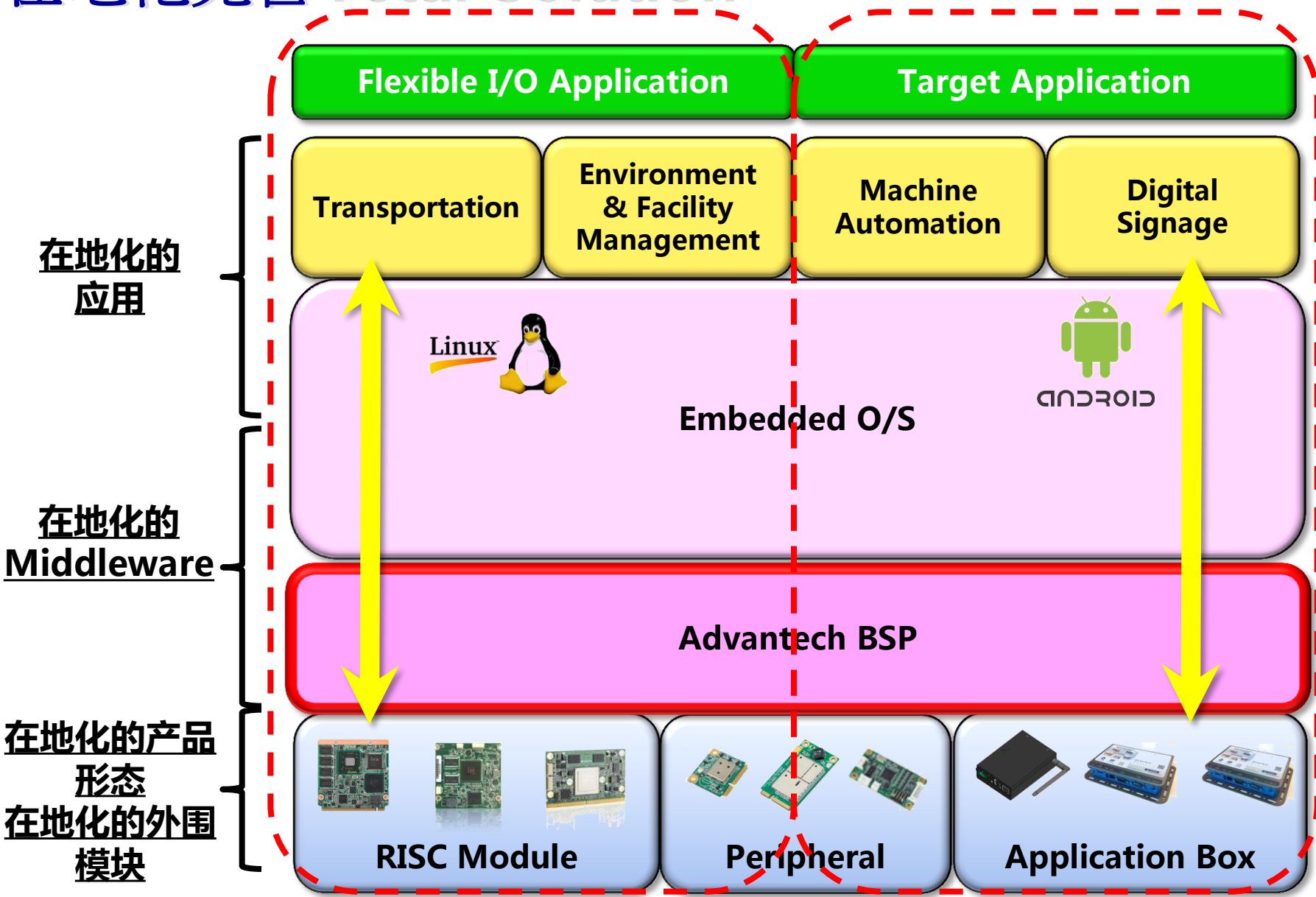
Boot Loader / Image

BSP / Driver / Utility

Middleware / API



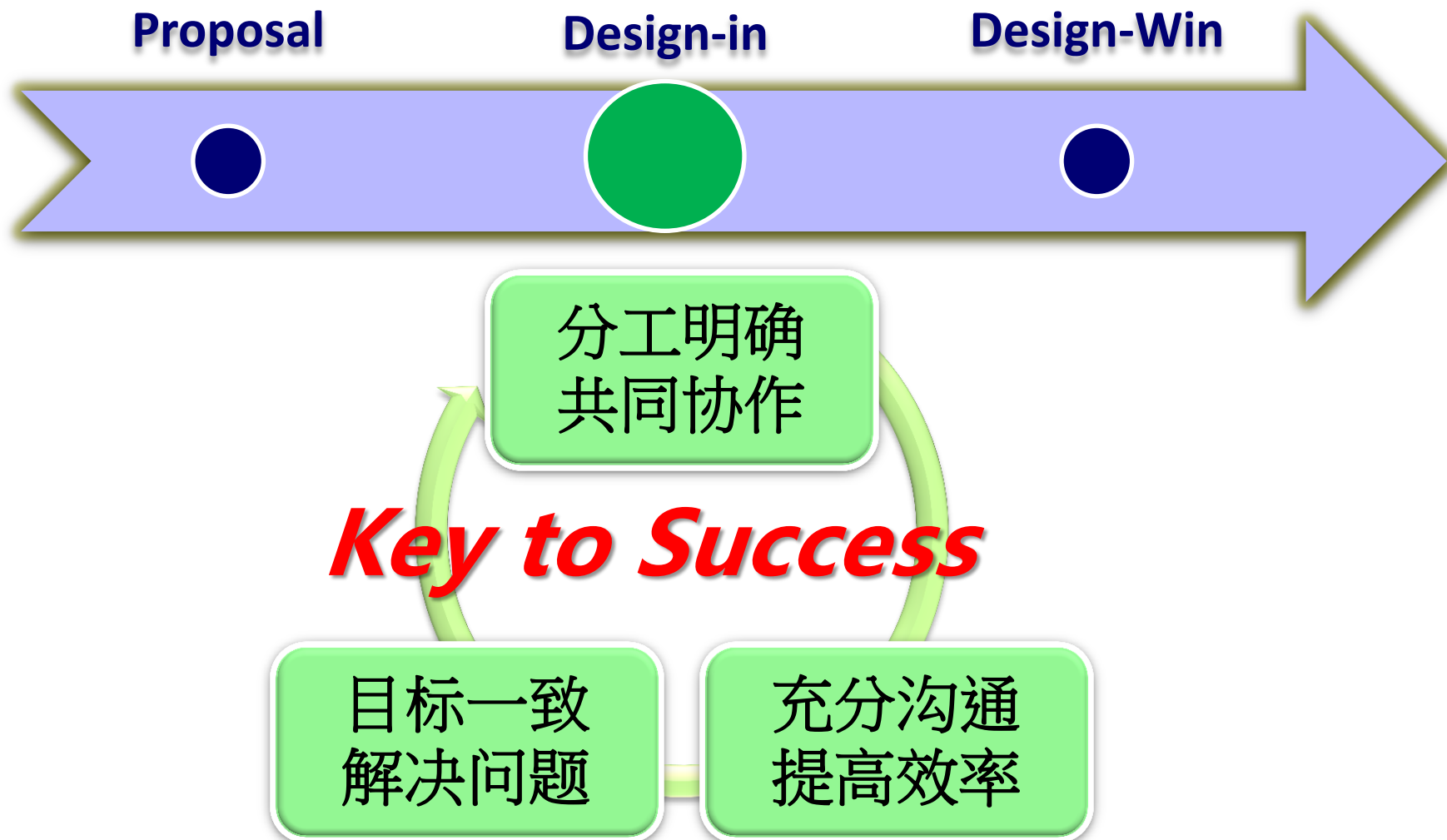
# 在地化完善Total Solution



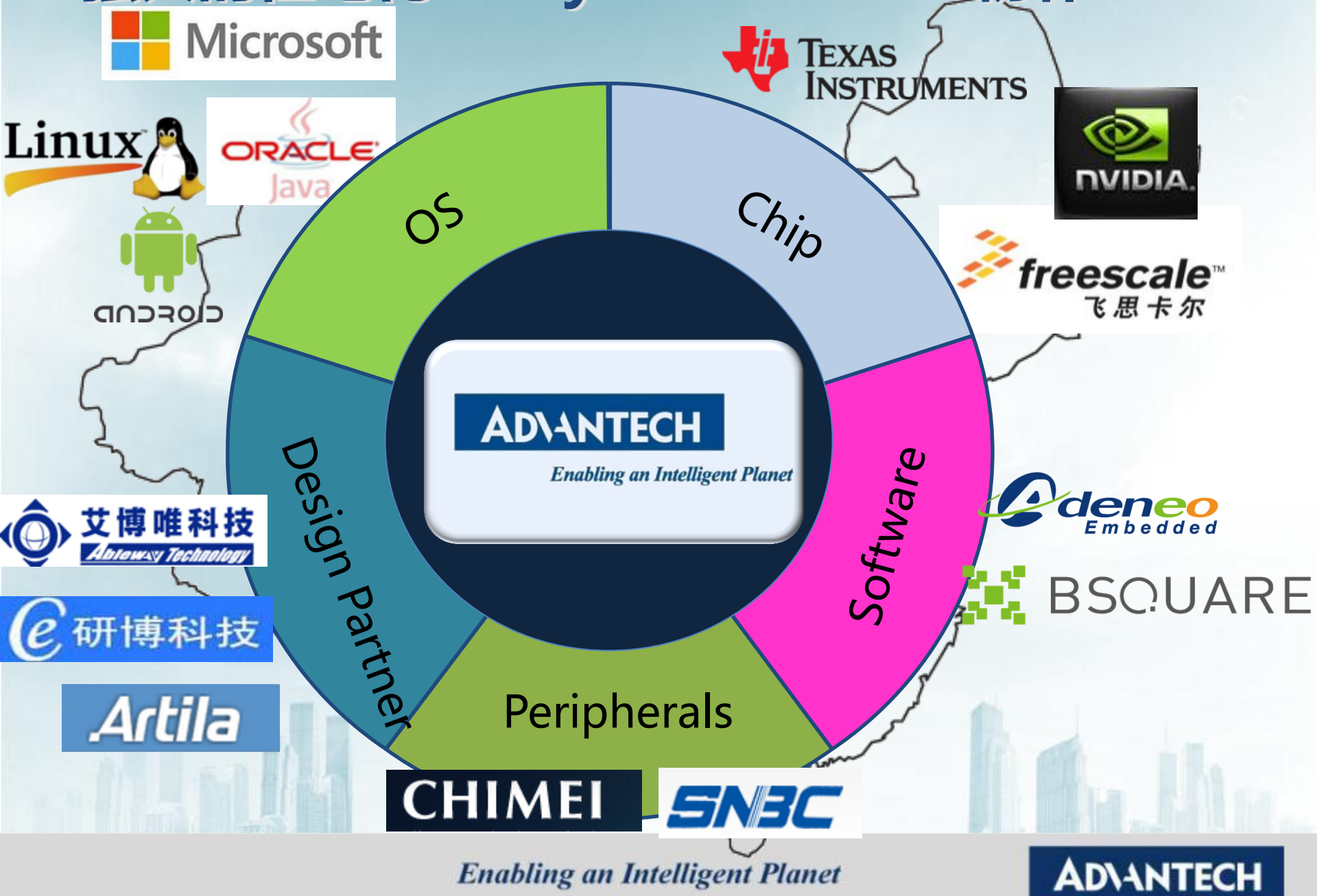
Enabling an Intelligent Planet



# 在地化的Design in Service



# 强大的在地化Ecosystem Partner协作



# Why Advantech

-专业分工, 一同促进IoT应用发展-



## 资源优化

不需布建研发团队  
不需负担开发风险  
不需管理技术变更

## 成本优化

不须承担备料成本  
不需负担换料成本  
取得最佳生产成本

## 时程优化

能够快速取得技术  
能够快速验证方案  
能够缩短开发时程



RTX



SMARC



Q7



3.5" SBC



2.5" Box



UBC Box

# Partnering for Smart City & IoT Solutions

驱动智慧城市创新 共建物联产业典范

